

Appln No. 10/623,528. Filed 07/22/2003 Response to Final Action of 04/18 /2006

Remarks/Argument

Claim 24 has been amended to distinguish clearly and patentably from the applied combination of prior references. Corresponding amendments have been made to others of the remaining claims to ensure that the language is consistent throughout. The superfluous two lines of text that somehow became left after the period at the end of claim 25 have been deleted.

The statement of invention at paragraph [0022] has been amended to correspond to the revised claim 24. It was noted that in line 5 of paragraph [0028] the previously used reference number 38 had incorrectly also been used at this location only for the pivot pins instead of the number 40; this is corrected in the amended paragraph.

Claims 24, 25, 27 and 29 are rejected under 35 U.S.C. 103(a) on the basis of the new combination of Voudouris (5913680) with Hanson (5685711). Voudouris and Hanson comprise essentially the same disclosure, insofar as they are pertinent to this application, in employing as their slot closing member a pivotally mounted thin flat spring of uniform transverse cross section along its length, and therefore also of uniform stiffness/flexibility from end to end.

At column 9, lines 8 through 14 Voudouris states:- "When the shutter 30 is in the closed position and the archwire applies a labially directed force to the shutter 30, the gingival end 36 of the shutter contacts the deflection surfaces 24 to inhibit the shutter from being accidentally removed from the archwire slot. At the same time, the lingual surface of 38 of the shutter 30 contacts the archwire 22 to urge it continuously into the archwire slot 20". However, it will be noted that in the Hanson citation the portion of this spring member on one side of pivot pin 64 provides the slot closure member, no part of which enters the slot, while the portion on the other side of the pivot provides the latch to hold the member in the slot closed position. It is submitted therefore that the Hanson disclosure adds nothing to that of Voudouris, and that it is only Voudouris alone that needs to be considered.

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The Voudouris structure presents difficulty in implementation in that the stiffness of the spring required to maintain slot closure under the difficult conditions encountered with orthodontic brackets is very different, and substantially greater, than is required for an attitude control spring that is to be in constant contact with the arch wire. It is a given with orthodontics that the forces applied to the brackets and teeth must be held within very precise limits, large enough to be effective, but not so large that the force on the tooth is excessive and/or inhibits movement between the bracket and the arch wire. With a spring of uniform thickness and stiffness as used by Voudouris it becomes difficult to devise a single spring that can meet these diverse requirements, if in fact that is possible in practice at all. It will be noted that with the cited Hanson structure the spring is used solely for slot closing and latching and does not enter the slot. If appropriate an archwire is used of size and shape to fill and protrude from the slot, as with the arrangement of Figures 9 and 10, where a D cross section wire is used.


These potential problems are traversed by the brackets of the invention in which an integrally formed slot closure member has its closure portion of appropriate greater thickness and stiffness, while the attitude control spring portion is of smaller thickness and correspondingly less stiffness, with the possibility of virtually complete independence between their respective flexibilities. The amended claim 24 contains such a specific limitation and is correspondingly novel and patentable over the disclosures of the references, alone or in combination. The claim is also now limited by its recitation of the specific structure for the attitude control spring portion that it is of recurved cross section to provide two arms, whereby the effective length of the portion is increased, thus giving further opportunity for control of the spring characteristic, and also to provide that the second arm free end that encounters the archwire can do so with the proper orientation to perform its desired control function. This recurved structure also enables the spring portion to be preloaded by its interaction with the adjoining bracket structure, giving another degree of flexibility in its design and implementation. No equivalent structure is disclosed in either of the references and it is believed that the claims as now amended, and directed to specifically to such structures, are even more clearly patentable over the references, alone or in combination.

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The amended language used in claim 24 has necessitated corresponding changes in language in claims 25, 26 and 28. Full support for the language used will be found in paragraphs [0043] and [0044] of the text as originally filed. As mentioned above the superfluous two lines at the end of claim 25 have been removed. The inclusion of the recitation of the recurved cross section structure in claim 24 has necessitated its removal from claims 26 and 27.

Prosecution of the amended application to allowance is believed clearly to be merited, and such allowance is therefore requested.

Respectfully:


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